

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2004/001493

## A. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both national classification and IPC  
IPC 7 G01N-3/34

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

US classes - 73/579, 73/12.09, 73/12.12, 307/400

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base, and, where practicable, search terms used)

USPTO - WEST, Classes 73/579, 73/12.09, 73/12.12, 307/400: Keywords: impact and acoustic, controller, refractory, flaws, resonant, acoustic, vibration, elastic, electret and "shock resistant", container, housing, "impacting tip", tip, actuator, cracks

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Measuring Refractory MOE at High Temperature: William L Headrick Jr. Robert E. Moore; Andre Van Leuven; Internet document: URL: <a href="http://www.ceramicindustry.com/CDA/ArticleInformation/features/Features_Index/1,2711,9-553,00.html">http://www.ceramicindustry.com/CDA/ArticleInformation/features/Features_Index/1,2711,9-553,00.html</a> . Posted - October 25, 2000 page 1, lines 2, 15 page 4, paragraph 4,	1, 2, 21, 22
Y	Impulse Excitation Technique for Dynamic Flexural Measurements at a Moderate Temperature; Kevin Heritage, Clayton Frisby, Alan Wofenden; Review of Scientific Instruments, 59(6), June 1988 page 973, introduction page 973 col. 2, line 18 - page 974, col. 2, lines 1 - 16	1, 2, 10, 19
Y	US 5214960 Kiyoshi Tsuboi, 1 June, 1993 col. 3, lines 64 col. 7, lines 3 - 10 col. 8, lines 45 - 62 col. 9, lines 55 - 63 col. 10, lines 4 - 11 col. 12, lines 8 - 9 col. 13, lines 44 - 45, fig. 14 col. 14, lines 41 - 50 col. 15, lines 18 - 30, 35 - 40, 51 - 53	1, 2, 3, 8, 27

Further documents are listed in the continuation of Box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international-type search  
18 November 2004 (18-11-2004)

Date of mailing of the international-type search report  
17 December 2004 (17-12-2004)

Name and mailing address of the ISA/  
Commissioner of Patents  
Canadian Patent Office - PCT  
Ottawa/Gatineau KIA 0C9  
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2004/001493

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6301967 B1 Donskoy et al, 16 Oct., 2001 col. 7, lines 24 - 46 Fig. 4	1, 2, 12, 13, 29
X Y	US 6202496 Jakob et al, 20 Mar., 2001 col. 4, line 59 - col. 6, line 32	23, 29 24, 25, 31
X Y	US 4470293; 11 Sept., 1984, Redmon col. 3, line 67 - col. 4, line 25	23 24, 25, 31
X Y	US 2418437 Vogt; 1 April, 1947 col. 2, line 46 - col. 3, line 25 col. 3, lines 48 - 51	23, 28 24, 25, 27, 30, 31
X	US 5506568; 9 April, 1996, Chen col. 2, lines 55 - col. 3, line 2 col. 3, line 34 - col. 4, line 21	33, 34
X	US 5818946; 6 Oct., 1998; Walter col. 3, lines 8 - 11 col. 3, line 45 - col. 4, line 51 col. 5, lines 13 - 22 col. 6, lines 22 - 26 col. 7, lines 3 - 6	33, 35
X	US 4550429; 29 Oct., 1985; Burbank et al Abstract col. 2, line 54 - col. 3, 20 col. 3, lines 38 - 55 col. 3, line 67 - col. 4, line 23	33
Y	Standard Test Method for Dynamic Young's Modulus, Shear Modulus and Poisson's Ratio by Impulse excitation of Vibration: ASTM E1876-99. figures 1, 3, 5, 7	9

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2004/001493

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1. ☐ Claims Nos. :  
because they relate to subject matter not required to be searched by this Authority; namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :
3. ☐ Claims Nos. :  
because they are dependant claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observation where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows :

### 1. Claims 1 - 47 comprising:

1.1 - Claims 1 - 22 comprising a system for measurement of elastic properties of a material comprising at least one impacting device, at least one acoustic detection device and a controller connected to the impacting device and the acoustic detection device.

1.2 - Claims 23 - 32 comprising an impacting device comprising an impacting tip defining a longitudinal axis and an actuator for moving the impacting tip along the axis, the impact tip being mounted to the actuator via a rod.

1.3 - Claims 33 - 37 comprising an acoustic detection device comprising a shock resistant container, a electret microphone mounted in the container via an intermediate shock absorbent material and an electric connection for coupling the microphone to a controller.

1.4 - Claims 38 - 46 comprising a method for determining resonance period of a material.

1.5 - Claim 47 comprising a method for characterizing cracks in a material.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos. :
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos. :

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2004/001493

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US4550429	29-10-1985	US4550429 A	29-10-1985
US5818946	06-10-1998	US5818946 A	06-10-1998
US5506568	09-04-1996	US5506568 A	09-04-1996
US6202496	20-03-2001	AT277343T T CA2251069 A1 DE19706744 A1 EP0900368 A1 US6202496 B1 WO9837401 A1	15-10-2004 27-08-1998 27-08-1998 10-03-1999 20-03-2001 27-08-1998
US2418437	01-04-1947	US2418437 A	01-04-1947
US5214960	01-06-1993	GB2254426 A US5214960 A	07-10-1992 01-06-1993
US6301967	16-10-2001	AU2572299 A CA2319478 A1 EP1060390 A1 JP2002502030T T US6301967 B1 WO9939194 A1	16-08-1999 05-08-1999 20-12-2000 22-01-2002 16-10-2001 05-08-1999